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CALIFORNIA COAST NEARSHORE PROCESSES STUDY

ERTS-A EXPERIMENT #088

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PROGRESS REPORT TYPE I, NO. V
CALIFORNIA COAST NEARSHORE
PROCESSES STUDY

1. OBJECTIVES OF THE STUDY

Multiple elements under the broad topic of nearshore processes are being studied with airborne and spaceborne sensor data coincident with sea truth. These elements include (1) nearshore currents, (2) estuarine flushing, (3) season river discharges, and (4) nearshore sediment dispersion. These processes are being studied primarily along the central and southern California coast. Sophisticated data processing techniques are being utilized to obtain the maximum information from available data, and to provide correlation and comparison when possible.

2. SUMMARY OF WORK PERFORMED DURING REPORTING PERIOD

During the period 1 September-31 October 1973 emphasis was placed on determining utilization of study results for operational needs of the U. S. Army Corps of Engineers (USACE). In coastal construction and protection projects the ERTS imagery represents a pertinent data source. Detection of the nearshore current component of littoral drift, offshore movement of fine suspended sediment, and seasonal variation of current are examples of useful detectable processes. After viewing all available ERTS data, four areas were picked for detailed analysis during the final three months of this study. They are: (1) Cape Mendocino-Ft. Bragg, (2) San Francisco-Monterey Bay, (3) Pt. Conception-Santa Barbara, and (4) Santa Barbara-Los Angeles. These areas combine the needs of USACE with the maximum ERTS coverage. This allows at least preliminary seasonal analysis of the dynamics of nearshore processes within these sites. Successful enhancement experimentation with a Flying Spot Scanner used for interpreting subtle offshore suspended sediment has led to the decision to emphasize this technique. Thirty bulk CCT tapes have been ordered for analysis. These scenes were picked after careful screening of all available imagery. The plans for the coming period include maximum use of the last three months of this study for providing information to operational USACE problems. These plans include final aircraft flights and sea truth collection.

In a recent review (26 October 1973) of this contract, a recommendation was made for a change in the format of the bulk CCT's provided by NASA. It was noted that the present format is ideally suited for processing where the investigator is interested in cross-spectral analysis of the data. However, in many cases only one or two bands are of interest (i.e., coastal water studies). The result of processing the CCT in the present format is that time consuming and expensive computer time and programmer time is spent separating needed information from unneeded information. A CCT format change which would allow the investigator to order tapes with single channel information is recommended. This would save from $50 to $75 per processed scene.

The effect of this change in format is illustrated in the following example. Processing time savings realized by investigators interested in information from only one spectral band would depend on the speed of the tape drives available for his use. For example, simply reading one tape in a 25 IPS tape drive takes around 30 minutes; processing this information and writing 1 spectral band on an output ta e takes approximately 10 additional minutes. Reading the four tapes and transferring to 1 output tape is therefore about a 3-hour operation when tape handling time is taken into consideration.

The savings in processing time if the recommended format were to be adopted would be approximately 2 hours per ERTS scene. This would result in a cost savings of approximately $75 per tape. The time savings realized when faster tape drives are used are smaller but still significant. For example, if the processing were to be done on an IBM 370 system with 125 IPS tape drives the time to read one strip and transfer one spectral ban to an output tape would take about 5 minutes. Using present formats and programming which would allow simultaneous read of 4 tapes would result in between 10 to 15 minutes of processing time. Changing the tape format would result in a savings of between 7 to 8 minutes of processing for an equivalent dollar savings of $50 per tape in computer cost. In the present tape order where 30 scenes are on order the cost savings using the 25 IPS system and the recommended single band tape would be $2250. In case 2 with the 125 IPS system the cost savings would be $1500.

It is also recommended that scene density in steps 14 and 15 of the NASA supplied transparencies be broken into more steps. This would be especially useful to investigators that need information from water bodies such as sediment and pollution studies. At the present the ΔD between steps 13 and 14 is .27 and between steps 14 and 15 it is .81 (on archival positives). Much of the information on this study is found in the step 14-15 density levels. Because of the ΔD of step 15 especially, it has been necessary to spend considerable time enhancing and expanding the density level to see subtle offshore features. The quantitative measurement of the densities however is not possible in detail. A possible solution would be to add steps in future ERTS imagery and decrease the ΔD. Possibly step 14 could be expanded to 2 steps and step 15 to 6 steps. This would be most useful to the coastal investigator.

The available ERTS imagery from each orbit that shows clear coastal areas have been formatted for monthly nearshore processes analysis. The objective of this process is to determine the transitory nature of sediment transport and nearshore currents were possible. Results from this approach will be compared with the classical surface oceanography for the California coast. The resulting information will be used in coastal engineering and planning.

3. SCHEDULE

The study is progressing as scheduled.

4. WORK PROGRESS

Analysis of coastal processes is progressing on schedule.

5. RELIABILITY

Emphasis continues to make scientifically correct analyses and interpretation from the ERTS, aircraft and sea truth data.

6. FUNDS

At this time the scheduled funding for this study is adequate to complete the tasks required.

7. PERSONNEL

Personnel remains the same at the time of this report.

8. PLANNED WORK

During the next reporting period 1 November-31 December 1973 analysis of monthly changes in test site coastal processes will continue. CCT processing and Flying Spot Scanner enhancement of 30 ERTS scenes will commence. Two aircraft flights over the test sites are scheduled.

9. SIGNIFICANT RESULTS

No significant results to report.